THE LAW AND ITS ECONOMIC IMPACT

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Abstract.— There is no adequate inventory of population size and distribution of most of the world's animal and plant species and lower taxa. Furthermore, populations are rarely static and continue to change in response to both natural and man-made factors. Thus clearance today for public works or industrial projects can be reversed tomorrow as new information becomes available. Lacking assurance that a project can be completed without new endangered species surfacing places an untenable constraint on the commitment of dollars for new long-term programs.

As a consequence of the absence of data, studies to determine occupied range, population levels, and habitat requirements of specific endangered species must be conducted on each project area. The direct costs of these studies are the responsibility of the project applicant. The time consumed results in project delays which can become a major expense item. Additional economic impacts are inherent in construction modifications and subsequent project operations intended to accommodate an endangered species.

Finally, the withdrawal of natural resources to support endangered species can conceivably reach a point where the squeeze on other societal programs becomes unacceptable.

Thank you for making this time available to me. It's always a privilege to get together with a group that is intentionally interested in a good program and talk problems out.

I brought along this book. I thought some of you might want to obtain a copy of it. It is a proposed environmental impact statement on the effect of grazing on some of our western lands. This little book cost $250,000 to prepare. It is, actually, an excellent study; you'll be much impressed by what the authors and the various research teams have put together in it. But as I read through it and came to the areas of my own expertise, I found that, if we are going to consider endangered species on this 800-square-mile area this book is about, we're going to have to do the job. The information on endangered species, on wildlife and nongame species in general, is treated once over lightly.

In the back of the publication, I began to read the letters received about this program from people who actually lived on the area; and who were going to be affected by it, not an outsider like me who was reading what I considered to be a very excellent program. Then it occurred to me that this was just like what had been happening to me. You know most of my professional career has been spent in research in the field of animal biology. When you come up with a new tool or a new program or a new project that is the result of research and you're very proud of accomplishing something new for wildlife management, you send the report all over the country for trial. When it comes back to you from first one point then another, reviewers state that it won't work here or that it produces an adverse affect there. You're very bitter about it—you even tend to react violently. Then you begin to realize that of all the things research values most highly it is knowing the limitation of the new tool. Where are the boundary lines where it works most effectively? If you do not recognize those boundaries early, you are liable to lose the use of the tool in the areas where it would be valuable. There are literally hundreds of examples in the last four or five years to bear this out and I won't have to elaborate.

One thing we have to realize is that in asking for habitat for endangered species we are in competition, and I'm using that term advisedly, with a lot of other conservation objectives. For example, over 100 years ago we began a national park system that has grown to some 300 units encompassing in excess of 31 million acres. The Brown Pelican, which has been so much in the news of recent years, initiated the first unit of the National Wildlife Refuge System that has now grown to 34 million acres. We have now reserved between 100 and 150 million acres where wild-

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life receives top billing.

Building on these established programs, and adding such new ones as the Wild and Scenic Rivers (1968), National Sea and Lake Shores, Wilderness (1964), National Trails System, Marine Protection Research and Estuaries (1972), Research Natural Areas, Coastal Zone Management Act, Agriculture's Water Bank Program, Wetlands, etc., has become a veritible national obsession. Currently President Carter, under the authority of the Antiquities Act of 1906, has proclaimed 56 million acres in Alaska as national monuments, and the secretary of the interior has temporarily withdrawn an additional 54 million acres from any commercial development. The U.S. Forest Service has under review some 62 million acres of "roadless areas" for possible inclusion in the Wilderness System. The Bureau of Land Management, overseer of 470 million acres of public lands, is engaged in a similar "roadless area" review to determine what lands of theirs would qualify for wilderness designation.

In a very limited way, habitats purchased specifically to protect an endangered species add to the set-aside totals. But the greatest impact will result from "critical habitat" designations that, while not infringing on any use that does not adversely modify the habitat for a given endangered species, still impose costly constraints on change, to the point of completely preventing some projects useful to man. Alternate uses that are affected by critical habitat constraints can be quite varied, as the following from the U.S. Forest Service's *Wildlife Management Manual* illustrates:

> Many projects and practices authorized or carried out by the Forest Service are of such a nature that modification of the vegetation or land is often a direct or indirect result. These include activities such as recreation site development, land exchanges, timber sales, revegetation and reforestation, type conversions, water impoundments, road and trail construction, grazing by herbivores, and development that results in significant increases in the level of human activity in an area.

The patterns for establishing critical habitats give little assurance that very many areas will be free of constraints to protect one or more endangered plants or animals. A number of critical habitats, both established and proposed, are disturbingly large. The critical habitat for the Manatee includes every major estuary in peninsular Florida, sits astride the busy intercoastal waterway, and is one of the most intensively used recreational boat areas in the United States. The proposed critical habitat for the grizzly bear suggests 13 million acres in Montana, Idaho, and Wyoming which encompasses two national parks, Yellowstone and Glacier. Throughout the visitor season, a succession of trails, campgrounds, and back-country are closed to people because of bears. As for the Whooping Crane, a proposal will about triple its present 90,000-acre wintering ground and provide seventeen migratory stopovers in six states and a new nonhistorical experimental breeding range in three other states. Some of these brief stopover points are not necessarily small areas. Along the Platte River in Nebraska the linear 54 miles of bottom land totals about 103,000 acres; the proposed migratory stopover on the Niobrara River is 115,200 acres; the large proposed area along the Canadian border in northwest North Dakota probably exceeds 2 million acres. Then, surprisingly, it is proposed to include the dams and lake margins between maximum and minimum pool of the two largest flood control impoundments on the Missouri River (Lake Oahe and Lake Sakakawea).

As tne endangered list grows by the addition of relatively little-known species and subspecies from the enormously large pool of living plants and animals these resource set-asides can provoke a reaction that will damage even the best features of the program.

The Regulatory Thicket

The independent, consumer-owned power companies serving some 200 municipalities in eight Missouri Basin States found their present capacity for electric power desperately below what would be needed in the years just ahead. So they formed the Missouri Basin Power Project, which began constructing its first generating plant, the Leland Olds Station, in 1962. The construction required only *one* government permit and was completed in four years. Unit No. 2 at this site required *five* permits and went on line in 1975. Their next cooperative project, the Laramie River Station and Grayrocks Reservoir, got under construction in 1976 and has thus far re-

quired *43 permits and approvals* from federal, state, and local authorities. Their third project, the Antelope Valley Station, begun in June of this year (1978), has at this early stage required *69 federal, state, and local permits*—all of this within the experience of one vital cooperative project serving an eight-state area.

Like illustrations of the maze of government regulations are at every hand. For example, the atomic-powered electric plant under construction at Midland, Michigan, has acquired some *93 permits* to date.

The redundant nature of some of these regulations is a sad commentary on the efficiency that has marked so much of America's progress. Take, for example, the construction of a transmission line that links North Dakota and Minnesota. Not only did the federal Rural Electrification Agency require an Environmental Impact Statement (Study), but a Certification of Need had to be obtained from the Minnesota Energy Agency, a Certificate of Corridor Compatability from the Minnesota Environmental Quality Board, and two separate permits for Site Compatability and for Route Designation from the North Dakota Public Service Commission. The transmission corridor crossed four navigable rivers requiring four separate construction permits from the U.S. Corps of Engineers. It made eleven other water crossings, each requiring separate permits from the Minnesota Department of Natural Resources; crossed three wetland areas requiring as many easements from the U.S. Fish and Wildlife Service; made eleven highway crossings, each requiring a permit from the respective county highway department—which was in addition to two separate permits from the North Dakota Land Department, one labeled State Land Crossing, the other River Crossing; and crossed five different railroads requiring permits for each location. It can be agreed that such a corridor has to obtain easements across every privately owned parcel of land, so why should public land be different? The point to be made here is the large number of governmental agencies have replicated input into a single project.

A review of Sections 7 Consultation Logs of the U.S. Fish and Wildlife Service's six regional offices for the period of October 1977 through May 1978 reveals that between 30 and 35 different federal and state agencies contacted the Office of Endangered Species for advice on their responsibilities under the act.

With such a galaxy of regulatory agencies afield, there are few, if any, projects that do not require a permit or license of some kind. A western cattleman will need a grazing permit to use public land, a farmer will need a point source discharge permit for return irrigation flows, to build a dock or bulkhead on your waterfront property will require a permit, and, even if you wish to participate in the recovery of a Peregrine Falcon, thus enhancing this endangered species, you must have a permit. Regulation reaches into the most remote corner of our society.

The regulatory morass motivated President Carter in March 1978 to issue Executive Order 12044 "as a first step toward ensuring that regulations achieve their statutory goals in the most effective and balanced way." This now has been followed up by the Presidential appointment of a Regulatory Council

to inform me, the public, and the Congress about the cumulative impact of regulation on the economy. The COUNCIL will help ensure that regulations are well coordinated, do not conflict, and do not impose excess burdens on particular sectors of the economy. The first report of this COUNCIL is to be made public no later than February 1, 1979.

At reoccurring intervals officials of the Office of Endangered Species have sought to clarify what is meant by critical habitat by saying that the act charges federal agencies—and only federal agencies—with carrying out provisions of Section 7. State and private actions not involving federal approval do not come under the act. This is meaningless comfort when it would be almost impossible to identify a private project that does not need some federal (or state) approval. Even if this were not so, Section 9 provides severe penalties for any person who "harasses, harms, pursues, hunts, shoots, wounds, kills, captures, collects, or attempts to engage in any such conduct" an endangered or threatened animal no matter where found. Thus the act, for all intents and purposes, affects public works and private projects alike.

The Permit: Often Elusive

The permit or license is elusive because it

can be withdrawn by the issuing agency on the basis of new information not previously considered, and because a court of law can order the permit suspended or withdrawn pending the outcome of a public interest suit which may rest only on some omission in the Environmental Impact Study. It can be disruptive because the regulation, or the factor requiring it, did not come into being until the project was partly completed.

Advancing technology has made most projects more complex to construct. Added safety and environment features, and the time-consuming efforts to comply with over-numerous regulations, all combine to lengthen construction time. Thus, to bring a major coal mine to full capacity, or a new power plant on line, can take ten years. Each year that passes sees a 10 percent increase in construction costs. With no assurance that a project can successfully negotiate the ever-changing maze of regulations, financing of projects that cannot be completed in a reasonably short time becomes quite a gamble.

The "biological opinion" resulting from a Sections 7 Consultation with the Office of Endangered Species is an agency approval (if granted)—in practice it has the force of a permit. A few examples will show that these biological opinions can exhibit every one of the above three deficiencies with respect to clearing the project for completion. Following completion of a broad Environmental Impact Study, the Bureau of Land Management received the following Section 7 biological opinion on a proposed phosphate mine on the Osceola National Forest in Northern Florida:

> It is my biological opinion, subject to the conditions identified herein, that the proposed project is not likely to jeopardize the continued existance of the endangered or threatened species listed above or result in the destruction or adverse modification of their critical habitats.

The conditions imposed are as follows:

> The Bureau of Land Management must reinitiate Section 7 Consultation should (1) new information reveal impacts of the above-listed species or their habitats which was not considered in this consultation, (2) the proposed leasing [be] subsequently modified, or (3) a new species [be] listed that may be affected by the proposed action.

The above clearance named only species on the established list. It did not mention that standing in the wings waiting to go on stage was a proposed list of plants and animals almost 10 times as long. Nor did it include Florida's official state list which names still other species. Lastly, on a project of this size, 52,000 acres, it should not be too difficult a task to come up with an undescribed species or one with very local distribution that has not yet been proposed for listing.

A well-known example of the late surfacing of an endangered species is provided by the Tellico Dam in Tennessee, where the small fish had not even been described as a distinct species of Darter until well after construction had begun.

More recently the Office of Endangered Species established a 54-mile stretch of the Platte River bottom in Nebraska as critical habitat for whooping cranes during migratory stopovers. Upstream some 275 miles was a power plant already under construction by the Missouri Basin Power Project. Extraordinary steps had been taken at the planning stage of this facility to have a conservation-acceptable project. Now, despite their holding all the required federal and state permits, their use of water from the Laramie River has been challenged in court because it might reduce by 4 percent the flow of water through the whooping crane's fall and spring stopover. This action threatens the $444,000,000 already invested in the project. Each lost day will cost $140,000 in interest on the money alone (or $50,000,000 a year).

Here, as in several other notable cases, the Endangered Species Act is being used to accomplish an entirely different objective. It is actually a matter of the continuing wrangle over water rights between the State of Nebraska, who initiated the court suit, and the State of Wyoming. Previously, the U.S. Supreme Court had awarded the water in the Laramie River to Wyoming, so there appeared to be no problem about the Grayrocks impoundment. What is incomprehensible to me is that midway between Grayrocks and the whooping crane's critical habitat is the Kingsley Dam in Nebraska that backs up Lake McConaughy, which is 20 times the size of the incompleted Grayrocks. The withdrawal of irrigation water at the Kingsley Dam must have marked

influence on the regulated flow in the Platte River.

The Informal Consultation

The Endangered Species Act of 1978, Section 7(c)(a) directs—

> each Federal Agency shall . . . request of the Secretary information whether any species which is listed, or proposed to be listed, may be present in the area of such proposed action. If the Secretary advises . . . that such species may be present, such agency shall conduct a biological assessment for the purpose of identifying any endangered species which is likely to be affected by (the project).

It is analogous to being directed to a well for a drink, a well that hasn't been dug deep enough to strike more than a suggestion of water, then being drafted into the work force to dig the well deeper. Although the act suggests that this responsibility might be discharged in 180 days, a review of past directives from the Office of Endangered Species shows that such studies can take from a few months to several years, depending on the complexity of the biological assessment.

A number of federal agencies have elected to prepare in advance of requests for specific resource use, an Environmental Impact Study covering districts or broad subdivisions. For example, the BLM has programmed studies on 173,919,000 acres of public lands subject to grazing. The estimated budget to provide the 142 separate studies at current prices is $35,500,000, an average of $250,000 each. To date, 16 EIS have been completed, but the entire area will not have been covered until 1988. The proportion of this program that can be assigned to providing data on endangered species is usually quite minor. For example, a breakdown of an Environmental Impact Study for a proposed surface mining project in Wyoming, which cost a private company $500,000, shows the wildlife/vegetational fraction costing $190,000, with only $18,000 (or 3.6 percent) related to endangered species information.

Another example: The Departments of Transportation in the six lake states routinely asked for advice if they proposed repairing or replacing a bridge. In fact, in the period of October 1977, through May 1978, 20.9 percent of the entries on the consultation logs in U.S. Fish and Wildlife Service, Region No. 3, concerned bridges, and another 20.5 percent highway actions. Just as routinely they received the following informal "opinion":

> Survey for endangered species or their habitat in the project area. (or) If through your investigations you find an endangered species or their habitat in the project area you should initiate a formal consultation.

In most instances involving bridges the interest was in one or more species of endangered freshwater mussels, which required the services of a qualified malacologist for underwater surveys and species identification. Aside from waiting for the proper season to do the work, these local studies could be completed rather quickly, as in the case of a contract to search 49,500 square feet of the Wabash River near Hutsonville, Illinois, at a cost of $2,500.

The Corps of Engineers, responsible for maintaining channel navigation in the upper Mississippi River, finds these same endangered freshwater mussel surveys far more costly and time consuming. They have awarded five research contracts totaling $263,977, four of which are now completed. A final report, *Freshwater Mussels of the Upper Mississippi River*, prepared for the corps by the Academy of Natural Sciences of Philadelphia, is a 400-page document. Please understand that this required study involved only freshwater mussels. Who is to say what other species and subspecies of freshwater invertebrates, fish, amphibians, or aquatic plants will require similar treatment in the future?

The magnitude of some of these studies to determine the impact of development projects on the environment is sobering. The Corps of Engineers has come under criticism for its dredging activities along our coasts and navigable rivers. Congress authorized a five-year thorough study of this program that has now cost $30,000,000. A part of that study is an eight-volume (1,502 pages) set of reports covering colonial bird use and plant succession on dredged material islands. Contracted to seven different teams of qualified ornithologists, these studies found that "62 percent of all colonial species (more than 156,000 adult birds) along the Texas coast in 1977 nested on dredged material islands." Included were the Least Tern, the Gull-billed Tern, the Roseate Spoonbill, the Reddish

Egret, and the Brown Pelican. In Florida, "approximately 50 percent of the colonial nesting sea and wading birds nest on dredged material and many more species use the islands for feeding and roosting."

What I gleaned from these studies was the exciting possibility of so locating and constructing these dredge-spoil areas as to create superior nesting habitat with minimal predation and disturbance pressure. But the decision between using the most cost-effective dredge disposal site and a wildlife-oriented one carries a price tag. For example, to avoid an endangered plant (Menzies Wallflower) the alternate to the most cost-effective disposal site for dredge spoil from Humboldt Harbor (California) is estimated to cost $150,000.

Some of the requests from the Office of Endangered Species for these preconsultation biological assessments pose enormous commitment of time and money. Take the case of the Nellis Air Force Range in Nevada. BLM received the following biological opinion:

> A study should be conducted to:
> (1) Determine all candidate and proposed threatened or endangered plant species which occur on the Nellis Range.
> (2) Delineate the exact locations of such populations.
> Such a study should be for at least one full collecting season during an average moisture year and prior to *any* activities that might jeopardize the existance of the subject species.

The above instructions for conducting the study are botanically sound, by reason of the fact that seeds of many species lie dormant in the soils of the arid Southwest for years awaiting an infrequent rain. Then rapidly the full plant cycle is completed while moisture is still available. But how do you foretell an adequate moisture regime? How do you fit such an indefinite timetable for survey and site mapping of arid-land plants into the hard realistic schedules of construction if it is to be cost effective and available when needed?

Summary: Under the 1978 version of the act, preconsultation biological assessments will be the responsibility of agencies seeking approval of programs authorized, funded, or conducted by them. The above examples illustrate the potential for delaying the start of the project and for adding (sometimes significantly) to the overall costs. It would seem that regulations have been imposed to protect animals and plants against extinction before there is any very precise knowledge of the tens of thousands of little-known or inconspicuous species of nongame animals, particularly invertebrates, and even less of plant species we have not chosen to propagate or value for their form or floral display.

Withdrawal of Resources

There is no way to avoid the commitment of natural resource if an endangered species habitat is to be protected. Some of these resources we can easily share, and others are not in excess of our economic needs. This is not to say that resources reserved to endangered species are irretrievably lost—but for current use they are not available, and this can seriously impact local industries dependent upon them for ongoing supplies.

For example, the U.S. Forest Service has presently located some 2,000 nesting colonies of Red-cockaded Woodpeckers in southeastern national forests. It has been determined that each colony nesting site averages 10 acres. One fourth of the colonies require an additional 25-acre recruitment area. This is a total of 70,000 acres in merchantable timber currently removed. The eventual goal is to have four such colonies per 1,000 acres, which would entail setting aside 140 acres/1,000 acres in suitable timber. There is an estimated 6,000,000 acres of pine types in the Red-cockaded Woodpecker's range on national forests. If the goal is eventually attained, it will mean that 840,000 acres of commercial timber is being devoted to the protection of one single endangered species.

While there is no system-wide management plan, several regions of the national forests have adopted the practice of setting aside against any modification eight acres about each Bald Eagle nest tree, together with an additional buffer zone limiting activities during the nesting season. In Alaska 2,760 Bald Eagle nests have been located and charted, thus automatically setting aside some 21,500 acres of merchantable timber. However, land use plans for national forests in southeast Alaska call for the reservation of approximately 50,680 acres of standard operable commercial timberlands along beach

areas, primarily for the protection of eagle habitat.

The endangered Kirtland's Warbler nests in northern Michigan in an early successional stage following fire. Here Jack Pine boughs screen a ground nest in a more or less contiguous low blueberry ground cover. The recovery plan calls for managing some 61,485 acres of Jack Pine on the Huron National Forest, by controlled burning, to provide this habitat. Elsewhere, on the Six Rivers National Forest in California a proposed timber sale of approximately 9.25 MMBF of merchantable timber was withdrawn to protect an endangered plant (Pine-foot). In New Mexico, the endangered Jemes Mountain Salamander requires deep shade and substantial amounts of moist, decomposing timber material on rocky north slopes. The management plan may withdraw as much as 2,500 acres to protect this habitat, though admittedly the timber is difficult to harvest. In Montana, habitat protection for the grizzly bear tends to limit the salvage of beetle-killed timber.

In a number of cases, *one* of the reasons given for listing an animal or plant as endangered is overgrazing. However, thus far only one proposal to close an area to grazing has surfaced. This is the Beaver Dam Slope area in southeastern Nevada, for the purpose of protecting the Desert Tortoise. But withdrawal of public range can take a number of forms. For example, prairie dog colonies on the Buffalo Gap National Grasslands in South Dakota have increased from 114 in 1968 to 479 in 1975—and the area occupied from 3,000 to 18,000 acres. Because of the endangered Black Footed Ferret that uses the prairie dog as a principal prey, the simple solution of removing these rodents to the point where range forage conditions improve is not acceptable. So the management plan calls for partial reduction in prairie dog numbers, accompanied by a reduction in livestock grazing that would have produced 319,000 pounds of beef.

But of resources in the western United States that are less than adequate for man's needs, water stands first. The most productive place to look for an endangered or threatened species is in an isolated spring or sink. Isolation created the adapting species and that same restricted habitat endangers them. These sites are very susceptible to withdrawal of water from underground aquifers for domestic use or irrigation. Thus, the Desert Pupfish prevailed in stopping a rancher from irrigating his alfalfa fields. In southwestern Texas three small fish inhabiting springs and headwaters of drainages to the Amistad Reservoir are proposed as endangered and/or threatened, the major reason being "excessive removal of ground water." Water uses in an area starved for that commodity can be affected many miles distant.

Even cities are vulnerable to this type of resource withdrawal. For example, to insure adequate water for future needs, the city of Cheyenne, Wyoming, acquired the water rights from the Little Snake River on the western slope, which they would bring through a tunnel under the Divide to Cheyenne. But below the water takeout points is the stream habitat of the Colorado Cutthroat Trout, considered for protective listing. To solve the impasse, Cheyenne agreed to release 5,000 acre feet of their anticipated 23,000 acre feet of water to maintain the trout habitat. The value of the water to the city is much greater than the $110 per acre foot necessary to develop the water collection project ($550,000 for this fraction).

The life's blood of the southwestern United States is the Colorado River drainage basin. It holds the key to every activity. Endangered species of fish have now been listed for different segments of this river system from Wyoming to Arizona. The impact of this program in so sensitive an area can be explosive.

Costly Project Modifications

The regional office of the U.S. Forest Service in California informed me in August 1978 that they had made 22 requests of the Endangered Species Office for formal Section 7 Consultations. At that time they had received 10 completed biological opinions, half of which recommended modification of a program. Similarly, the regional office of the Forest Service in Montana had received final biological opinions on five programs, 80 percent of this number recommending changes. Many of the project modifications were the product of interagency planning that min-

imized cost and disruption. But others add appreciably to project costs.

The Florida Power and Light Company, serving the electric needs of southeastern Florida, is literally being painted into a corner by a maze of conservation set-aside areas, including critical habitats for four endangered species. They sought permission to build a transmission line to cross about a mile of one corner of the Loxahatchee Wildlife Refuge. They offered to purchase another tract of land of equal value that would be suitable habitat and, in addition, provide $1 million for its development. They failed to get the easement because it was "incompatible with the Everglade Kite Critical Habitat." The line has now been detoured around that corner of the refuge at an additional cost for construction of $1,200,000. The public utility contends that the easement they sought contained neither Everglade Kites nor the Apple Snail on which they feed.

Clear across the continent another public utility, Southern California Edison, experienced increased project costs of a somewhat different nature. A 17-mile equipment haul route to the San Onofre Nuclear Generating Station near San Clemente, California, from the off-loading dock was required. Due to terrain, land ownership, and load weight constraints, the route was to follow along the coastal beach just above the high tide line. During 1976, a portion of the route became populated with a colony of Least Terns. After several meetings with the Least Tern Recovery Team, it became obvious that a new haul route and/or construction schedules and equipment delivery times would have to be changed. The studies and altered schedules to avoid equipment arrival during nesting period (April–September) resulted in direct costs of approximately $800,000.

In northern Colorado, the Peabody Coal Company was enlarging its mining operation, which is to serve as the sole fuel source for Colorado-Ute's Power Plant at Hayden. Peabody had surveyed and purchased a right-of-way for a haul road to deliver the coal when a local staff member of the Colorado Division of Wildlife called attention to a cultivated wheat field along the route that was used each spring by a small group of Greater Sandhill Cranes. These migratory stop-over sites are termed "dancing grounds" because certain prebreeding rituals take place in this period. Peabody had prepared an Environmental Impact Study on their program and circulated it to state agencies, but it evidently did not come to the attention of anyone knowledgeable about the cranes. The greater Sandhill Crane is on the Colorado state list as endangered, but not on the federal. This situation required Peabody to reroute their delivery road and purchase a new right-of-way.

The Arkansas State Highway Department, although filing a formal request for a Section 7 Consultation on the proposed routing of a four-lane highway, decided independently on an alternate route to avoid the cave habitat of the federally endangered Gray Bat and a state-listed cavefish and grotto salamander. The envisioned adverse affects were not the physical disruption of the right-of-way, but the off-chance that a chemical spill would occur on the completed highway that would enter the underground aquifer that feeds a more distant cave. This alternate action lengthened the highway by a little over two miles, which will cost taxpayers an estimated $3,000,000.

Addressing Problems, Not Solutions

The Soil Conservation Service has had some rather difficult experiences with the endangered species legislation. A small watershed program has broad participation of affected parties in project planning. The usual goal is to prevent the loss of topsoil in the upper basin and destructive flooding in the lower basin, and to improve permanent water sources, be it stream flow or small reservoir.

The Cypress Creek Watershed in Lauderdale County, Alabama, and Wayne County, Tennessee, was just such a project. But the biological assessment that SCS funded turned up an endangered small fish, the Slackwater Darter, one of 80 species and subspecies of darters in Tennessee. The biological opinion from the Office of Endangered Species pointed out that the project would adversely affect the Slackwater Darter because of its very unusual reproductive requirements. While typical of a slow-flowing stream with silt and

gravel bottom, this Darter makes use of high (flood) water to swim off-stream into seepage areas in open pastures for breeding. OES approved four water retarding structures on Little Cypress where no darters were found, but blue-penciled for the time being 15 structures on other branches of the system. This darter needs flooding, but the fields and small towns down valley don't.

In Mississippi, after identification of the Bayou Darter in the Bayou Pierre Watershed, over $100,000 was spent by SCS to identify the habitat and critical elements of that habitat. Planning and taking into account habitat location and the critical elements of the habitat resulted in selecting land treatment and 13 floodwater retarding structures as the proper approach. An analysis of impacts on the scope and extent of habitat and the critical factors in the habitat indicated no significant impact on the Bayou Darter. But the Office of Endangered Species disagreed. High on their list of reasoning was the *inability to predict induced land changes* that might be accompanied by increased pesticide residues, siltation, etc. This would not appear to be an objection to the project per se, but to the opportunity it provided individuals within the improved watershed to upgrade their economic pursuits which just might adversely affect the darter.

Conclusion

The impacts of the Endangered Species Act have so many facets and ramify into so many corners of our society that it has been impossible in a short paper to bring you very much of the information finding its way across my desk in the last three months. However, it should be abundantly clear that much of the burden of performing research and adjusting to endangered species requirements is falling outside the coterie of government agencies, private organizations, and individuals who are expressly committed to the management of wildlife and native plants. Imposing that obligation places a critical responsibility on those wielding the legislation to fully determine that the programs are biologically sound and economically practical. As the list of endangered species grows, it will take the wisdom of Solomon to avoid fencing in the economy until it will no longer serve you. You have very little time to establish a favorable rapport, for the program comes up for another congressional review in one and one-half years. You have this in your favor: there is almost no one who doesn't enjoy some aspect of the living world about us.

Questions to Dr. Spencer

Q. If I interpret your comments correctly and place them into a context of the relationship they might have to those of Dr. Clement, there is a real, immediate requirement for changing some of the cultural practices we presently have. Is this interpretation correct?

A. I am sorry folks. I live in a pretty practical world and am not prepared to go into the theories and philosophies of management. So if I may, I am going to duck that question.

Earlier this morning one of our speakers said that he was often asked, "What is the value of a given endangered species and how do you compare it with the costs that we are going to face in providing priority-use habitats?" The House/Senate Conference Report (No. 95-1804, dated 15 October 1978) has this to say:

> . . . to balance the benefits associated with the agency action against the benefits associated with alternative courses of action, they should not balance the benefits of the action against the value associated with the listed species.

I take this to mean that there is to be no attempt to place a monetary value on a species threatened with extinction. In other words, the instruction is to compare the economic impact of the different alternative actions, but not to place a value on wildlife for the purposes of comparative costs.

Q. That is correct. It is an act of Congress, I think.

A. It is in the Endangered Species Act Amendments of 1978. The Solicitor General's Office will provide decisions on these matters.

Q. Several of your comments were directed toward the relative costs of changing a project or altering a project in order to be in accord with the Endangered Species Act. You seem to be saying by this that it costs a lot of money for other government agencies, private companies, and the like to accommodate their designs with the requirements of the Endangered Species Act. I won't argue with that. It's true. It seems that we need a priority system to go along with it. As an example, let me tell you a little story. I had to do an environmental impact statement for a power line. The question in my mind was, "Is this power line needed?" I never got a satisfactory answer from the power company or anyone else that it was necessary. It seems to me that we need a priority system whereby we can feed that kind of information into the decision-making process because it is possible that someone might plan something without a real need for it.

A. I would suggest that this is not a normal procedure. People generally do not build what they do not need. It is normal not to encumber an expense un-

less you anticipate some beneficial return. Before being too hasty to ascribe a motive to a person, organization, or project to which we might have some objection, I suggest we follow the motto that says, "Don't criticize your opponent until you have walked a mile in his moccasins."

Q. The other point I thought you were trying to make is that people here in the audience ought to be aware that there is a very bad economic penalty or economic cost, if you want to put it in those terms, with this particular piece of legislation and that if we fail to recognize those costs that are there, we may be in jeopardy of losing the program entirely.

A. You have stated my opinion very well. We are proud of what we have been able to accomplish in wildlife conservation in this country. Until very recently, these wildlife programs have been totally self-supporting and have not dipped into the tax till to which the general public contributes. Now we have turned around and are progressively passing the costs along to companies, organizations, and the general public for projects in which they have little first-hand interest. It is up to us to be sure that the cooperation we ask of them is a wise investment for all parties.

The new environmental laws, including the Endangered Species Act, came into being during a period when we were economically well off. Now we are experiencing a period of inflation, high taxes, and a cost of living that is affecting every pocketbook. It is time for us to be very, very careful we don't crowd this unfavorable economy. If we ask for too much, if we wield this powerful legislation with too much enthusiastic abandon, we stand to have Congress remove it from the books. Please remember it comes up in Congress for reappropriation in 18 months. In the 39 years I worked for the federal government, 34 of those years with the Fish and Wildlife Service, every time the economy dipped our appropriations were among the first to be cut. I don't think times have changed.

There are relatively few endangered and threatened species on the lists at the present time compared to literally thousands that only await the proper study to be added. We have established critical habitat for only 33—a not too complicated procedure when only one species in an area is considered. But in the future, you can anticipate that critical habitats will involve acreages and overlaps that will noticeably fence in the economy.

In my opinion, the 25 amendments to the Endangered Species Act in 1978 succeeded only in making the legislation more difficult to administer, and equally more difficult to comply with. It is now so complex that it is self-defeating.